REMARKS

Claims 1 and 8-19 are presently pending. Of these, Claims 16-19 are withdrawn from consideration. Amendments to the claims are discussed below. No new matter has been added herewith. The following addresses the substance of the Office Action.

Written Description

Claims 1 and 8-15 were rejected under 35 U.S.C. § 112, first paragraph as failing to comply with the written description requirement. Referring to page 5, lines 15-24 of the Office Action, the Examiner asserted that the claims encompassed a "vast genus of agents encompassing inactivated or attenuated *M. cynos*, or a structural protein of *M. cynos* or a nucleic acid encoding said structural protein in an immunogenic composition that has the capability of raising a directed (unnamed) immune response against the bacteria of *M. cynos* in a dog, and further comprising an agent in said immunogenic composition that has the capability of raising a directed (unnamed) immune response against the bacteria selected from the group consisting of an inactivated or attenuated *S. zooepidemicus* or *Chlamydophila* species aforementioned above, or a structural protein of *S. zooepidemicus* or *Chlamydophila* species aforementioned above, or a nucleic acid encoding said structural protein of *S. zooepidemicus* or *Chlamydophila* species aforementioned above in a dog."

In response, the Applicant has limited the claims to recite inactivated or attenuated *M. cynos*, *S. zooepidemicus* and *Chlamydophila*, only. Accordingly, the amended claims are limited to only two options for each organism, for which the application provides a sufficient written description.

The Examiner also asserted that, in order to adequately describe this vast genus of agents, the application must describe the immunoepitopes that convey these activities. However, as is well known and self-evident in the art, inactivated or attenuated bacteria in a vaccine composition contain the majority of the bacterial immunoepitopes. Thus the amendment renders moot any need to specify individual epitopes that are capable of raising an immune response.

The Examiner acknowledged in the Office Action that the claimed antigens are "well known in the art leading to predictable results" (see page 10, lines 21-22; page 13, lines 16-17; and page 16, lines 9-10). Thus, it appears that the Examiner would agree that the application provides a sufficient written description of the presently claimed compositions comprising

inactivated or attenuated *M. cynos*, *S. zooepidemicus* and *Chlamydophila*. Accordingly, the Applicant respectfully requests that the rejection under 35 U.S.C. § 112, first paragraph be withdrawn.

Obviousness

Mackenzie et al. in view of Hansen et al. and Hymas et al.

Claims 1, 8-9, 12 and 15 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Mackenzie et al. (EP 0415794A1) in view of Hansen et al. (U.S. Patent No. 5,665,363) and Hymas et al. (U.S. Application Publication No. 2002/0150593).

According to the Examiner (see page 10, lines 13-16 of the Office Action), the combination of Mackenzie et al. and Hymas et al. teaches an immunogenic composition comprising inactivated whole cell *M. cynos*. The Applicant does not agree. Mackenzie et al. provides no motivation for the person of skill in the art to formulate a vaccine against *M. cynos*. Mackenzie et al. does not refer to *M cynos* as an organism known to cause any disease, but merely provides an unsupported assertion that *M. cynos* is of veterinary or medical interest (page 3 lines 15-18). Thus, there is no reason for the skilled person to modify an *M. cynos* composition as allegedly taught by Mackenzie et al. in the way suggested by Hymas et al. Hymas et al. specifically refers to compositions with efficacy in protecting cattle from mortality and morbidity associated with bovine respiratory disease complex. There is nothing in either Hymas et al. or Mackenzie et al. to suggest that *M. cynos* is involved in bovine respiratory disease complex, so the person of skill in the art would not have combined these documents. *M. cynos* is simply one of 19 mycoplasmas listed by Mackenzie et al. To the extent that the skilled person was motivated to combine Hymas et al. and Mackenzie et al., the skilled person only had reason to select a mycoplasma that was known to cause a disease, such as *M. bovis*. Since no medical disease or condition was associated with *M. cynos*, there was no known reason to apply the teachings of Hymas et al. to Mackenzie et al. with respect to *M. cynos*. Therefore, one of ordinary skill in the art would not have done so on the basis of the cited references.

According to the Examiner at page 10, lines 17-20 of the Office Action, the combination of Mackenzie et al. and Hansen et al. teach an immunogenic composition comprising inactivated *C. psittaci*. However, the Applicant does not accept the Examiner's position that it would have been obvious to combine the inactivated *M. cynos* of Mackenzie et al. and Hymas et al., together

with the inactivated *C. psittaci* of Mackenzie et al. and Hansen et al., because there is no reason provided by any of the cited documents to make a single immunogenic composition containing both *M. cynos* and *C. psittaci*.

According to Mackenzie et al. (see Example 10), *C. psittaci* is known to infect and cause disease in sheep. However, *M. cynos* is not known to infect or cause disease in sheep. Thus, the skilled person would see no value or purpose in combining *M cynos* in an immunogenic composition with *C. psittaci*.

Neither Mackenzie et al. nor any of the other cited documents provide any reason for the person of ordinary skill in the art to formulate a combined composition for raising an immune response against both *M. cynos* and *C. psittaci*. Since these two organisms are not known to infect or cause disease in the same species, there was no possible reason for the skilled person to even contemplate such a combined composition. Moreover, it is not correct to assume that a microorganism, which causes a specific disease in one species causes the same disease, or indeed any disease, in another different species. Thus, not only was there no reason to make the combined immunogenic composition, the skilled person would not have made it because the combined composition would have been deemed to have no value.

Notwithstanding the foregoing remarks, to clearly distinguish over the cited references, the Applicant has deleted recitation of *C. psittaci* from the claims. There was no reason for the person skilled in the art to combine the cited references and arrive at the presently claimed compositions because the combination of cited documents does not provide all of the features of Claim 1. Claims 8-9, 12 and 15 either depend from Claim 1 or depend from a claim that depends from Claim 1 and so encompass all of the limitations of Claim 1. For all of the above reasons, Claims 1, 8-9, 12 and 15, as amended, are not obvious in light of Mackenzie et al., Hansen et al. and Hymas et al.

Mackenzie et al. in view of Hansen et al., Hymas et al. and Acree et al.

Claims 1, 8-9, 12 and 15 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Mackenzie et al. (*supra*) in view of Hansen et al. (*supra*), Hymas et al. (*supra*) and Acree et al. (U.S. Patent No. 4,824,785).

As discussed above, the combination of Mackenzie et al., Hansen et al. and Hymas et al. does not provide all of the features of amended Claim 1. Thus, Claim 1 and the claims depending

therefrom are all non-obvious in light of this combination of documents. Acree et al. does not cure the deficiencies described for Mackenzie et al., Hansen et al. and Hymas et al. regarding Claim 1, nor does the Examiner allege that it does. Thus, Claims 1, 8-10, and 12-15 cannot be obvious in light of Mackenzie et al., Hansen et al., Hymas et al. and Acree et al.

Acree et al. was cited as allegedly teaching an immunogenic composition comprising an attenuated modified live canine coronavirus, which the Examiner has alleged to be canine respiratory coronavirus, absent evidence to the contrary. However, the evidence from Acree et al. itself is that the virus was not canine respiratory coronavirus.

As acknowledged by the Examiner, Acree et al. teaches that the respiratory symptoms of disease are minor, referring to a "slight ocular discharge," and "slight nasal discharge" (see Acree et al. at column 2, lines 18-19). This is in stark comparison to the severity of the enteric symptoms that can lead to death. Indeed, the virulent canine coronavirus (CCV) disclosed in Acree et al. was isolated from a dog that died of gastroenteritis (see column 2, lines 60-62; and column 8, lines 8-10). Also, according to column 2, lines 13-24, the respiratory symptoms of disease were "seen experimentally by the inventors," and not in a normal infection process. Further, according to column 3, lines 27-29, the attenuated virus had the very useful feature of selectively infecting the intestinal epithelium, which again is evidence that the CCV of Acree et al. is an enteric virus.

The Examiner referred to Example 2 of Acree et al. as teaching that the CCV replicated in the trachea after intranasal inoculation as evidence that it is canine respiratory coronavirus (CRCoV). However, the Examiner ignored the fact that the virus also replicated throughout the intestinal tract after intranasal inoculation. The conclusion drawn by Acree et al, which contradicts that of the Examiner, is that the respiratory tract may be the natural port of infection for an intestinal coronavirus.

In summary, in light of the severity of the enteric symptoms caused by the CCV, the person of ordinary skill in the art would not consider the canine coronavirus disclosed by Acree to be a canine respiratory coronavirus.

Notwithstanding the preceding remarks, the Applicant has amended Claims 9 and 19 to recite that the canine respiratory coronavirus (CRCoV) is a Group II coronavirus. Page 24, lines 1-12 of the specification as filed describes CRCoV by reference to Applicant's earlier patent

application WO 2004/011651 (of record in the present application) and to a publication by Erles et al (2003). Both of these documents clearly refer to CRCoV as a Group II coronavirus (see, pages 3-5 of WO 2004/011651, and the Title of Erles et al.). Page 24, lines 4-6 of the present specification refers to the HE protein of CRCoV, and it is known in the art that only Group II coronaviruses possess an HE protein (see, page 3 lines 19-22 of WO 2004/011651). Thus, the amendment to state that the CRCoV is a Group II coronavirus has support in the present specification as filed. Moreover, page 5, line 12 of WO 2004/011651 explicitly states that enteric CCV is not a Group II coronavirus. Not only is the CCV described by Acree et al. not a respiratory coronavirus as discussed above, it is not a Group II coronavirus as required by amended Claim 9. Accordingly, the combination of the cited documents does not provide all of the features of the claims with respect to CRCoV. Accordingly, the skilled artisan would not have arrived at the presently claimed compositions on the basis of these references.

For all of the above reasons, Claims 1, 8-10, and 12-15, as amended, are not obvious in light of Mackenzie et al., Hansen et al., Hymas et al. and Acree et al. Accordingly, the Applicant respectfully requests that the rejection be withdrawn.

Mackenzie et al. in view of Hansen et al., Hymas et al. and Brown et al.

Claims 1, 8-9, 11-12 and 15 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Mackenzie et al. (*supra*) in view of Hansen et al. (*supra*), Hymas et al. (*supra*) and Brown et al. (U.S. Patent No. 5,661,006).

As discussed above, no combination of Mackenzie, Hansen and Hymas provides all of the features of amended Claim 1. Thus, Claim 1 and the claims depending therefrom are all non-obvious in light of this combination of documents. Brown et al. does not cure the deficiencies described for Mackenzie et al., Hansen et al. and Hymas et al. regarding Claim 1, nor does the Examiner allege that it does. Thus, Claims 1, 8-9, 11-12 and 15 cannot be obvious in light of Mackenzie et al., Hansen et al., Hymas et al. and Brown et al.

Brown et al. was cited as allegedly teaching an immunogenic composition comprising a canine coronavirus (CCV) Spike protein from a virus that was alleged to be canine respiratory coronavirus (CRCoV), absent evidence to the contrary. However, the evidence from Brown et al. itself is that the virus is not CRCoV. For example, in the section of column 1 cited by the examiner, Brown et al. states that, following infection with the CCV, the enteric symptoms are

"dominant." Thus, the skilled person would not consider the CCV disclosed by Brown et al. to be CRCoV.

As discussed above, the Applicant has amended Claims 9 and 19 to state that the CRCoV is a Group II coronavirus. Thus, the Spike protein in Claim 10 must come from a Group II coronavirus. The CCV disclosed in Brown et al. is not a Group II coronavirus (see Brown et al. at column 1, lines 55-57; the genome does not encode an HE protein, which is definitive feature of a Group II coronavirus). Thus, Brown et al. does not disclose a Spike protein of a Group II coronavirus as required by Claim 10.

As further evidence, the Applicant has used the GeneStream align program on the internet at http://xylian.igh.cnrs.fr/bin/align-guess.cgi, which uses FASTA for alignments, to compare the Spike protein amino acid sequences of the three different CCV isolates of Brown et al. (CCV6; Insavc; CCV-C54) with the Spike protein sequence of CRCoV disclosed in WO 2004/011651 (isolate T101), and with the enteric CCV strain 1-71 discussed on page 5 lines 8-11 of WO 2004/011651. The results are as follows:

Amino acid sequence comparison	**% identity**
CRCoV isolate T101 vs. CCV isolate C54	25.8%
CRCoV isolate T101 vs. CCV isolate CCV6	25.4%
CRCoV isolate T101 vs. CCV isolate Insavc	25.7%
CCV isolate 1-71 vs. CCV isolate C54	96.4%
CCV isolate 1-71 vs. CCV isolate CCV6	96.9%
CCV isolate 1-71 vs. CCV isolate Insavc	94.4%

It is clear from the percent sequence identities that the three different CCV isolates of Brown et al. are not CRCoV, but are very closely related to the strain 1-71 enteric CCV.

As discussed above, page 5, line 12 of WO 2004/011651 explicitly states that enteric CCV is not a Group II coronavirus. Thus, not only is the CCV described by Brown et al. not a respiratory coronavirus, it is not a Group II coronavirus as required by Claims 9-10. Accordingly, no combination of the cited documents Mackenzie et al., Hymas et al., Hansen et al. and Brown et al. provides all of the features of the claims with respect to CRCoV, and thus cannot render the claims obvious.

For all of the above reasons, Claims 1, 8-9, 11-12 and 15, as amended, are not obvious in light of Mackenzie et al., Hansen et al., Hymas et al. and Brown et al.

No Disclaimers or Disavowals

Although the present communication may include alterations to the application or claims, or characterizations of claim scope or referenced art, Applicant is not conceding in this application that previously pending claims are not patentable over the cited references. Rather, any alterations or characterizations are being made to facilitate expeditious prosecution of this application. Applicant reserves the right to pursue at a later date any previously pending or other broader or narrower claims that capture any subject matter supported by the present disclosure, including subject matter found to be specifically disclaimed herein or by any prior prosecution. Accordingly, reviewers of this or any parent, child or related prosecution history shall not reasonably infer that Applicant has made any disclaimers or disavowals of any subject matter supported by the present application.

Co-Pending Applications of Assignee

Applicant wishes to draw the Examiner's attention to the following co-pending applications of the present application's assignee.

Docket No.	Serial No.	Title	Filed
ERP02.001APC1DV	11/849931	VACCINE COMPOSITION FOR VACCINATING DOGS AGAINST CANINE INFECTIOUS RESPIRATORY DISEASE (CIRD)	04-Sep-2007
ERP02.001C2	12/816214	VACCINE COMPOSITION FOR VACCINATING DOGS AGAINST CANINE INFECTIOUS RESPIRATORY DISEASE (CIRD)	15-Jun-2010
ERP02.003DV1	12/239527	CANINE RESPIRATORY CORONAVIRUS (CRCV) SPIKE PROTEIN, POLYMERASE AND HEMAGGLUTININ/ESTERASE	26-Sep-2008

CONCLUSION

In view of Applicants' amendments to the Claims and the foregoing Remarks, it is respectfully submitted that the present application is in condition for allowance. Should the

Examiner have any remaining concerns which might prevent the prompt allowance of the application, the Examiner is respectfully invited to contact the undersigned at the telephone number appearing below.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

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